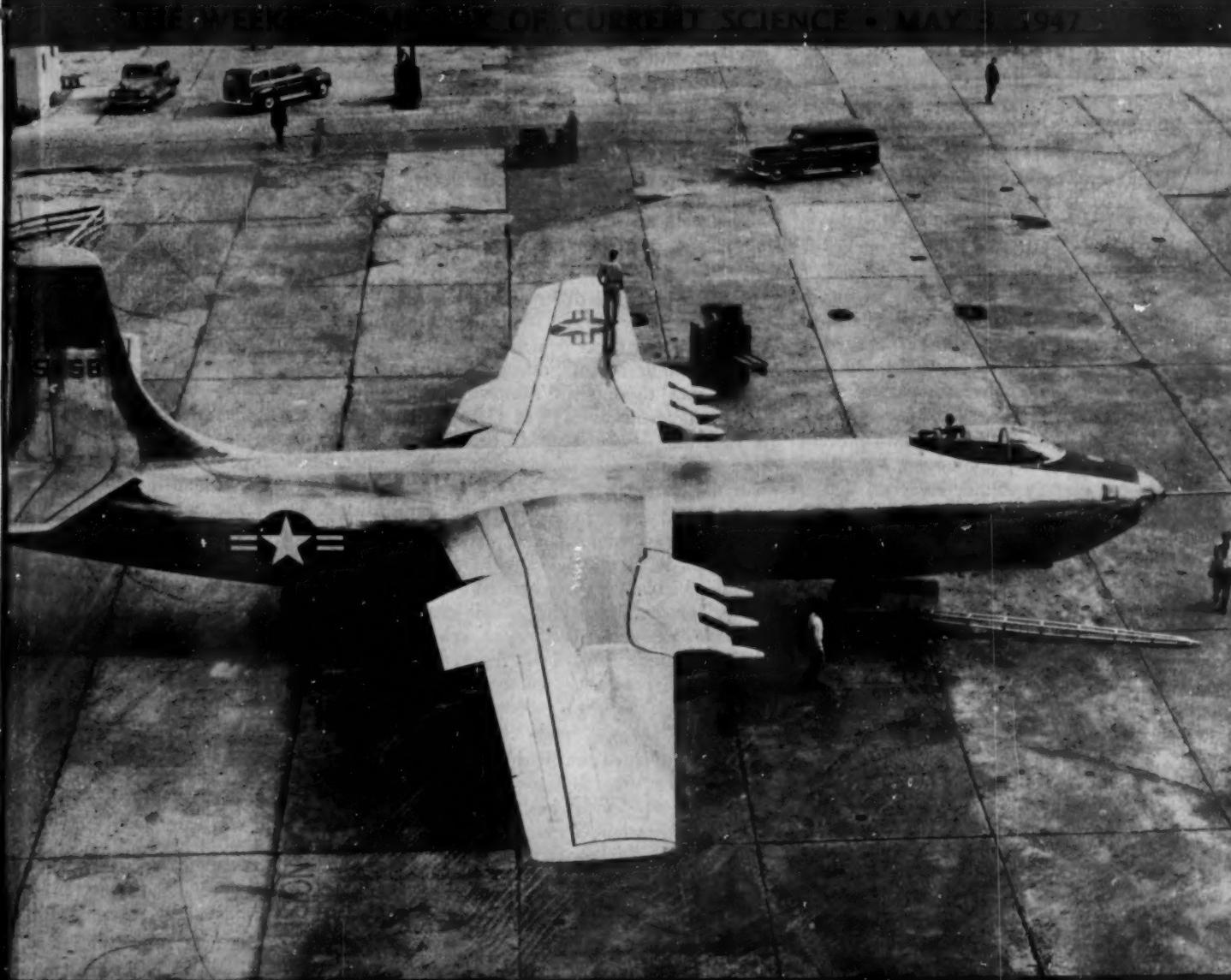


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SCIENCE NEWS LETTER

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New Jet-Bomber

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A SCIENCE SERVICE PUBLICATION

DENTISTRY

Chemical's Role in Caries

Amino acid may prevent tooth decay. It changes saliva of persons with caries to a saliva like that of persons without tooth decay.

► TESTS of a chemical that may become a new tooth decay preventive are now under way on a small group of human guinea pigs at Forsyth Dental Infirmary in Boston.

The chemical is called tryptophane. It is one of the amino acids that are building blocks of proteins in meat, cheese, blood and muscle. Its possible role as a tooth decay preventative was discovered by Mrs. Naomi C. Turner. Latest findings are reported by her and Dr. George E. Crowell in the *Journal of Dental Research* (April).

Children just over an attack of measles, mumps, infantile paralysis or other virus-caused disease may in future be given some doses of tryptophane to protect their teeth from the decay that frequently starts after these diseases. This is suggested by one part of Mrs. Turner's studies.

Whether tryptophane will prevent tooth decay is not known yet. Mrs. Turner has already found, however, that it changes the saliva of persons with tooth decay to a saliva chemically more like that in persons who have no tooth decay.

Lowers Blood Sugar

Tryptophane also lowers the amount of sugar in the blood. This discovery was unexpected and is being further studied by an expert on diabetes. Until its exact significance is understood, Mrs. Turner feels that use of tryptophane for attempted control of tooth decay should proceed with caution. In her own experiments, the chemical is given as a white, crystalline powder in water midway between breakfast and lunch. It will take some time before results from these studies show whether or not tryptophane controls tooth decay.

First clue to the possible role of tryptophane in preventing tooth decay was discovered surprisingly, because Mrs. Turner was making a three-year study of the common cold among school children. She was finding out things about colds that could not be explained, so she decided to go back to school herself and learn more biochemistry. In

a laboratory study of the effect on starch of saliva, where cold germs might lurk, she found that her own saliva was different from that of the girl working next to her. She made the test on others in the class and found the difference was related to whether or not they had much tooth decay.

This difference, called "dextrinizing time," is in the rate at which the saliva converts starch into sugars. It is fast for saliva from persons with tooth decay, slow for persons without.

Other Chemical Difference

Another chemical difference in salivas from mouths with and without tooth decay is the rate at which the saliva takes the color out of preformed starch blue. From those with rampant tooth decay it takes an average of 13 minutes to turn the starch blue white. Saliva from those without caries does it in less than five minutes.

These and other studies lead Mrs. Turner to believe that tooth decay and freedom from it are associated with varying amounts of two enzyme chemicals in the saliva. The chemicals are called alpha and beta amylase and they play a role in changing starch into sugar. An enzyme more familiar to the layman is pepsin in the stomach which plays a part in digestion of protein foods.

A little Negro boy who had had mumps gave the clue to the possible use of tryptophane to protect children's teeth after certain childhood diseases. When this little boy first came to the dental clinic, he had a "dextrinizing time" of 120 minutes, and good teeth.

Some months later when re-tested, his dextrinizing time had dropped to 35 minutes. At this time, Mrs. Turner was using a new test for the dextrinizing time, and she thought perhaps it was a poor test and that was the reason for the conflicting results on the little boy's saliva. But when Dr. Crowell, her dentist associate, examined the boy's teeth the second time he found several new cavities. Questioning the boy's mother,

they found he had had mumps in the time between the two tests.

Remembering that the mumps virus lives in the saliva-producing glands, Mrs. Turner began wondering whether the virus had something to do with the change in the boy's saliva and, subsequently, in the development of cavities in his teeth.

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MEDICINE

Growth Studies to Bring Clues to Cause of Cancer

► CLUES to the cause and possible control of cancer will come from fundamental research into the secrets of life and growth.

This is the opinion of Dr. E. Newton Harvey of Princeton University. Dr. Harvey spoke at a meeting of the American Cancer Society in New York.

One result of scientific probing into growth secrets, Dr. Harvey said, was discovery that cutting a nerve in the tissue of an insect results in a tumor. This has no relation to human cancer, but it may give some clues to fundamental causes of cancer.

There will be no chemical cure for cancer developed in the immediate future, Dr. Perrin Long of the Johns Hopkins University School of Medicine predicted. Dr. Long is the scientist who introduced the sulfa drugs into this country.

The way to the development of a chemical treatment of cancer will be very difficult. Dr. Long said that the nitrogen mustard gases and certain sleeping medicines, called urethanes, were being investigated, but nothing like the sulfa drugs and penicillin had been found for cancer.

The scientists all agreed that vast sums of money are needed, both for research and to extend treatment of cancer patients. Five million dollars could be used almost immediately, but no more than \$20,000,000 could be spent for research purposes within a single year during the near future.

The limit is due to lack of personnel and facilities. Personnel and facilities are needed for research, treatment and training of new workers. The estimate was made by Dr. Lewis Weed, chairman of the National Research Council's Committee on Growth, which allocates the American Cancer Society's research funds.

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Cosmic Rays From Sun

Minute particles, more powerful than atom radiations, may come from solar flares around sunspots. Stars other than our sun may send rays to earth too.

► AN ANSWER to one of the great mysteries of the universe has been suggested.

The mystery: Where do cosmic rays come from?

The solution: Some cosmic rays at some times come from the sun. They may come from the solar flares which occur in the neighborhood of sunspots. If they do, then flares on stars other than our sun may account for all the rest of the cosmic rays which bombard the earth from outer space.

Cosmic rays, more powerful than atomic radiations, pierce your body more than 20 times each second. The reason you survive this attack is that so few of these rays reach the earth.

Dr. Frank H. J. Figge of the University of Maryland Medical School recently reported experiments linking cosmic rays with cancer. He believes cosmic rays may act on certain chemicals in the human body to start cancers.

"Circumstantial" Evidence

Evidence that some cosmic rays come from the sun was presented to the meeting of the National Academy of Sciences. Scott E. Forbush of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington cautioned that the evidence of cosmic rays coming from the sun is "circumstantial."

Clues to the solution of the mysterious origin of cosmic rays came from the sunspots that interfere with your enjoyment of shortwave radio broadcasts.

When sun flares appear, the scientist explained, shortwave radio broadcasts may be wiped out. This is because the flares near the sunspots send out ultraviolet light. The light strikes the ionosphere over our heads. Shortwave radio broadcasts are normally reflected from the ionosphere. When the ionosphere is attacked by the ultraviolet light from sun flares, the broadcasts do not get through.

Scientists at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington keep records of these disturbances. They also have

instruments which record the intensity of cosmic rays bombarding the earth. These two sets of records may give scientists the first real clue as to the origin of cosmic rays.

Cosmic Rays Increase

Mr. Forbush said three unusual and sudden increases in cosmic rays have been recorded in the last 10 years. All three of these periods of increased cosmic ray activity were at the same time as radio fadeouts and sun flares. This made Mr. Forbush suspect that the sunspot flares are responsible for some of the cosmic rays which bombard us.

The flares during the three periods of cosmic ray increase were extremely intense and unusually long. No cosmic ray increases were noticed during other flares during the period.

Cosmic ray observations were made at widely separated points. At Cheltenham, Md.; Godhavn, Greenland, and Christchurch, New Zealand, the un-

usual increases were noted at the time of the three flares. Near the magnetic equator, at Huancayo, Peru, no increased cosmic ray activity was observed.

The flares and cosmic ray increases were recorded for Feb. 28, and March 7, 1942, and July 25, 1946.

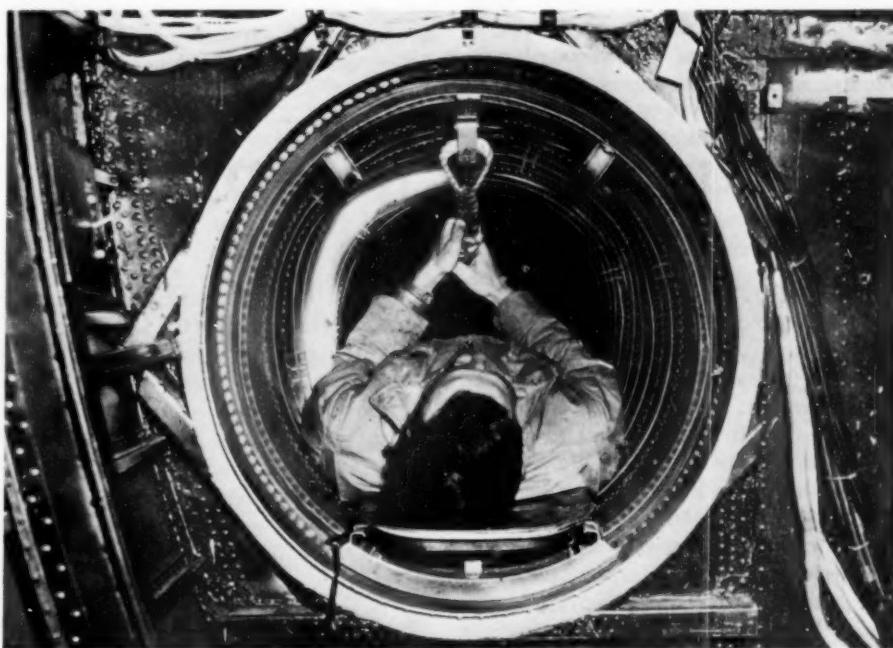
Sun flares act like giant-size betatrons, one of the atom-smashers of modern science, according to the new theory of cosmic rays. Mr. Forbush explained that it is known that there are very strong magnetic fields in the region of sunspots. These magnetic fields are continually changing in intensity. This sets up an electrical field.

The electrical field generates particles powerful enough to reach the earth. These are the cosmic rays which created the three periods of intense cosmic ray activity. This same process on stars throughout the universe sends a continuous bombardment of cosmic rays through space to the earth.

Oddly enough, it has been calculated that the total effect of the cosmic rays reaching the earth's surface is about equal to the light from the stars.

The theory presented contradicts many other explanations of cosmic rays, though some scientists have suggested a magnetic acceleration such as Mr. Forbush proposed.

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BOMBER SUBWAY—To get from one compartment to another in flight on the mammoth XB-36, crew members must ride a miniature subway. The tunnel is two feet in diameter and 85 feet long. A scooter, propelled by an overhead cable, is the subway "car".

PUBLIC HEALTH

Epidemics Threaten Nation

Facts support opinion that lack of money and shortage of personnel may cause our health defenses to crumble.

► INCREASING danger of epidemics threatens the nation. Public health experts are alarmed. They fear that our health defenses are crumbling.

Low salaries for the professional public health workers are the cause. These men and women are the troops who hold the front line of the war against disease. But like the school teachers, they are being forced out of health departments into other work in order to meet the increased costs of living. Few new recruits can be found to fill the ranks.

The storm signals are up, warns Dr. C. E. A. Winslow, the editor of the *American Journal of Public Health*. He lists some of them as follows:

One-third of the people of the nation are without the services of a local health department organized on a full-time basis.

Fewer than half the counties of the United States have organized full-time public health protection.

An average of only 61 cents per capita was spent for local health service in 1942 in the face of an estimated need of at least \$1 per capita.

AERONAUTICS

Faster Planes to Appear

See Front Cover

► THE FIGHT for faster planes in the better than 500-miles-an-hour class continues. Two forthcoming versions are now revealed. One is a six-engined gas-turbine jet bomber. The other is a rocket-powered research craft to explore behavior in speed-of-sound flights.

The bomber, built by the Glenn L. Martin Company, Baltimore, is reported ready for field taxi tests. The supersonic research craft, an improved brother of the Army XS-1, is under construction by Bell Aircraft Corporation, Buffalo, the organization that built its predecessor.

The new jet-propelled bomber, to be known as the XB-48 until finally ready for mass production, when it will be

The physicians and engineers who are currently receiving graduate training in public health are fewer than the number needed to fill existing vacancies.

The salaries paid to public health nurses are in many, if not most, health departments below the decent subsistence level for a self-respecting professional.

The universal opinion of state health officers is that lack of personnel is the chief obstacle to extending public health protection in their states.

"The death of a child living on a back street, or on the edge of a swamp or in a mountain cabin, the convulsions of an expectant mother, an epidemic of one sort or another, are the kinds of things that inevitably happen when public health service is inadequate," Dr. Winslow declares.

The only solution, he says, is to increase salaries of public health workers, whether doctors, sanitary engineers, nurses and all. Most states and cities need to increase salaries by at least 20% on the average to get and keep able workers. In many communities the rate of increase should be much greater.

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sonic flights, in the 500-to-800 mile range, and of supersonic flights of higher speeds. The purpose is to obtain scientific data upon which to base the designs for future Army combat aircraft.

The XS-2 has a stainless steel body, and like the XS-1, is rocket powered. Rocket engines built by Reaction Motors, Inc., power the earlier plane, which is now undergoing field tests in California. Unlike the XS-1, which has conventional wings, the new plane will be equipped with swept-back wings, a feature that is expected to contribute to speed.

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HISTORY OF SCIENCE

Benjamin Franklin Started Science Ties with Russia

► IF BENJAMIN FRANKLIN were living today he might be accused of subversive activities by American super-patriots. He might even be haled before a Congressional investigating committee.

Before the meeting of the American Philosophical Society, founded 204 years ago by Franklin himself, a Russian student of scientific history, Dr. Eufrosina Dvoichenko-Markoff, produced proofs that this elder statesman among the Republic's founding fathers had been in active correspondence with Russian scientists, was a member of the Russian Academy, and sponsored the candidacies of two Russians for membership in his own Society. Franklin, in fact, established the first scientific contact between Russia and this country.

Franklin's two candidates for membership in the American Philosophical Society were both of the nobility: Baron de Klingstedt, whom he met in 1777, and Princess Dashkaw, who was elected to membership in the Philosophical Society in 1789, the same year that saw Franklin's election as a foreign member of the Russian Academy.

Dr. Dvoichenko-Markoff, who presented these hitherto unknown facts in Russian-American scientific history, is a lecturer at the New School for Social Research, New York.

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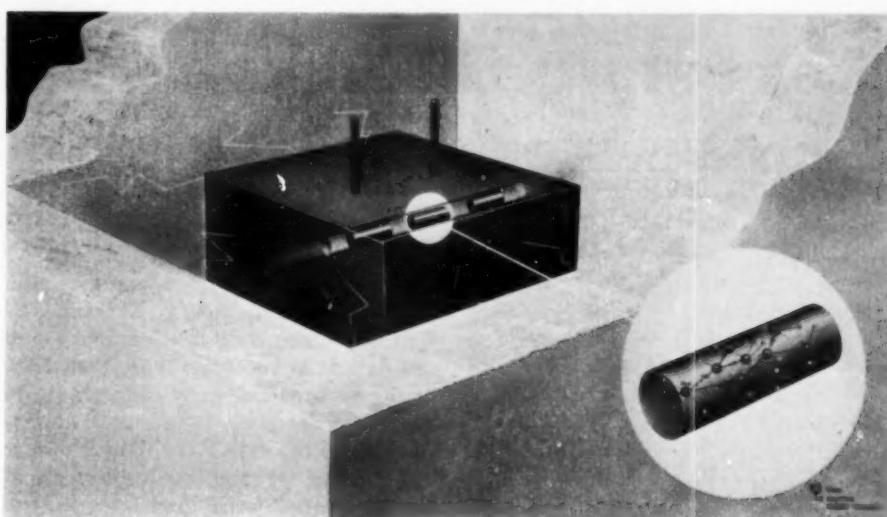
BIOCHEMISTRY

Fungi Family Feuds Kill Participants in Battle

► BITTER FAMILY feuds between fungi belonging to the same species, ending in the generation of poisons that kill the feudists and all their relations, have been discovered by Dr. Arnold J. Ullstrup of the U. S. Department of Agriculture, working in the laboratories of Purdue University.

He grew mutually antagonistic cultures of the fungus that causes dry-rot of corn. Subsequently he filtered and sterilized the liquid culture fluid on which they had been fed. This filtrate proved toxic to either of the warring fungus strains, to any culture of the same species, and to some fungi outside the species.

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ATOMIC PILE—Visualization of Brookhaven scientists shows what goes on inside a graphite pile structure. Inset is a drawing of a chain reaction to produce power, neutrons and radioactive isotopes; White dots represent fission products, dots within circles U235, and dark dots show neutrons.

NUCLEAR PHYSICS

Atomic Energy Laboratory

Government-owned Brookhaven National Laboratory will have staff of 300 scientists to study peacetime use of atomic power and will become a training center.

► BROOKHAVEN National Laboratory for atomic research is now under construction at Brookhaven, L. I., N. Y., on the 6,000-acre site of Camp Upton and will be ready for the 100 scientists expected later this year.

It is a government-owned, government-financed undertaking, operated by Associated Universities, Inc., under contract with the United States Atomic Energy Commission. Associated Universities is an organization of nine major Eastern universities. Representatives of these institutions constitute the board of trustees which is erecting the plant and will direct the laboratory's activities.

The plan is to make this project a center of atomic research and training, particularly to find peacetime applications of atomic energy. The laboratory will provide facilities for research to universities, industrial organizations and other research groups under a permanent scientific staff, and it will be equipped with apparatus which individual institutions would be financially unable to obtain.

Some of its scientific activities are already under way, particularly the design

of an atomic pile and other large equipment. Plans call for the construction of a graphite uranium pile, and what will be known as a "hot" laboratory where radioactive isotopes may be separated. A second pile is planned; it will have 100 times the neutron flux of the first.

A 30- to 40-million electron volt cyclotron is to be obtained; also an electro-nuclear machine capable of accelerating either electrons or positive particles to energies of a billion volts. A 20,000,000-volt electro-static generator is another piece of equipment of the heavy type.

The laboratory expects to concentrate on fundamental research. This will include work in the physical, chemical, biological, medical and engineering aspects of atomic science. With a permanent scientific staff of 300, and a visiting staff from cooperating universities of 200, it will become a great training center for young scientists, it is expected, as well as a research institution.

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Flavor in peanut butter depends in part on stopping the roasting of the nuts at precisely the right moment.

MEDICINE

Preventing Ulcer Relapses

Anti-ulcer hormone obtained from hog intestines helps patients get well without relapses. Expense of preparing medicine limits research.

► A MEDICINE which helps stomach ulcer patients get well and stay well even after they have stopped taking it was reported by Drs. A. C. Ivy and M. I. Grossman, University of Illinois, at the meeting in Chicago of the American College of Physicians.

The medicine is called enterogastrone. It is a hormone chemical obtained from hog intestines. In the form now used, it is a white powder with a bitter taste which forms a light tan, clear solution in water. The patients get it by injection into the muscles, so they do not know about the bitter taste.

Enterogastrone is expensive. As now produced on a laboratory scale it costs about \$2 to produce the amount needed for one patient for one day, although this daily dose amounts to only a few grains. Patients get the medicine six days a week for one year.

Because of this high cost, the number of patients on whom it has been tried has been limited. So far, 58 patients have been given the medicine. Today Dr. Ivy reported on 27 patients.

Results are "excellent" in 23 of this group, he stated. Although five had a return of ulcer symptoms during the course of treatment, they are all now free of such symptoms. Of the 27, five have been without symptoms for a year or more since they have stopped getting the medicine. One man has gone 25 months without ulcer symptoms and without treatment.

One 60-year-old man, who had ulcer attacks four and five times a year for 47 years, is now on his second course of enterogastrone treatment for return of symptoms. But for the first time in 20 years he was without trouble from his ulcer for a period of nine months.

Dr. Ivy emphasized the relapse-preventing effect of enterogastrone. With the usual medical treatment, about 60 out of 100 ulcer patients relapse within two years. With enterogastrone, the relapse rate is very much lower, and it is lower than it was previously in this group of patients.

Explaining what enterogastrone is, Dr. Ivy pointed to the common experi-

ence that a fatty meal causes the stomach to empty slowly. Experimentation has shown that, in the average person, when fat composes more than 10% of the volume of a meal, stomach movements are depressed and stomach emptying is slowed. Along with this there is a checking of the hydrochloric acid production by the stomach.

The fat, however, acts in the intestine, not the stomach, to check stomach activity. This stomach-checking action is due to a hormone, enterogastrone, released from the intestinal walls when fat is in contact with them.

Use of this hormone in treatment of stomach ulcer followed studies showing that hydrochloric acid and pepsin are factors which extend an ulcer and make it chronic, though they probably do not start the ulcer.

In other studies, it was found that an ulcer which occurs in 98% of dogs following a certain kind of operation could be prevented in all but 24% when they were given enterogastrone. In addition, ulcer failed to develop in all but two of 28 dogs in the usual time after treatment was stopped.

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PHOTOGRAPHY

New Instrument Aids In Aerial Photography

► AERIAL photographs, made in surveys of large areas, may now be taken along straight and parallel lines in the sky. It is done with the aid of a new instrument used in conjunction with the war-developed navigation system known as Shoran.

The new device is an Army development, already tested in flight. Perfected models of the instrument will enable a pilot to fly a 100-mile course without deviation of more than 100 feet.

Shoran itself was developed for the precision bombing of known targets while blacked out by weather or darkness. A plane equipped with special transmitter-receiver apparatus can know

its exact position by use of high-frequency radio beams sent out and received back from two land-based stations. The apparatus computes the location automatically by triangulation. The system has now been adapted to use in making aerial surveys of great tracts of land.

As the aircraft flies its course, the new indicator installed in the photo airplane is mechanically simulating in miniature the flight path of the plane. A pointer on the indicator precisely duplicates the craft's progress and direction over the ground. Threaded rods, calibrated to scale, accurately indicate the actual distance from the aircraft to each of the two ground stations.

When the aircraft drifts from its set course, the Shoran equipment automatically pulls the pointer away from the indicator's simulated flight path. The pilot immediately makes the necessary correction in his course.

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WOOD TECHNOLOGY

American Woods to Rival Burma Teak for Ships

► WHEN THEY "hit the deck" on future Navy ships, our sailors will do it on U. S. A. wood. Burma teak wood, standard for battleship decks, has a new rival. The deck material is a built-up, specially treated product of American woods, developed by the U. S. Navy and the U. S. Forest Products Laboratory, Madison, Wis.

Several types of this so-called composite wood are under test on Navy vessels. One type, installed on the landing deck of a giant carrier, has already successfully withstood 18,000 airplane landings. It is made of layers of redwood and cottonwood, both treated with resins and compressed to considerably less than original thickness.

In other types, basswood and hard maple are used. The ideal is a hardwood face and under surfaces of lighter weight domestic wood. The idea is to make American warboats independent of imported woods such as the costly teak from Burma. This has been the standard covering for weather decks on United States battleships and cruisers for nearly half a century. Teak is prized for its strength and durability, and the government stock piled a lot of it in 1939.

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BIOPHYSICS

Electricity of Human Cells

When sitting or lying still you burn energy at the rate of a 100-watt lamp by passing electrons over compound "batteries", connected in series.

► YOUR BODY uses up energy at about the same rate as a hundred-watt lamp when you are sitting or lying still, Prof. Eric G. Ball of Harvard Medical School stated before the meeting of the American Philosophical Society in Philadelphia. Like the lamp, the body obtains this energy by a process which involves the flow of an electric current.

"In the living cell, electrons flow from the foodstuffs we ingest to oxygen, thus reducing the oxygen to form water," he continued. "The 'filament' of the cell over which these electrons flow is not of uniform composition as it is in a light bulb. The electrons in the cell are passed along over a chain of compounds composed of iron-containing proteins, the cytochromes, and vitamin-containing units named coenzymes.

"The over-all process involves a potential change of about 1.17 volts and a total flow of current in all the body cells which amounts to about 76 amperes. The process occurs, however, in a step-wise fashion which involves five or six successive transfers of electrons between the various components comprising the cellular 'filament' or oxidative chain. Each pair of components may thus be looked upon as forming a battery, with the pairs connected in series. A drop in voltage occurs with the interaction of each pair in this series, the magnitude of which may be estimated from our knowledge of the

oxidation-reduction potentials of each of the systems involved."

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CHEMISTRY

Heavy Oxygen Will Aid Studies in Chemistry

► A KIND of heavy oxygen, with an atomic weight of 18 instead of the usual 16, can now be used to settle long-disputed points in chemistry and physiology, Dean Hugh S. Taylor of Princeton University told the American Philosophical Society. The isotope-separation techniques developed by the Manhattan District make this type of oxygen available for research purposes in any reasonable quantity if the cost can be met.

As an example of the long-standing problem already solved with molecules "tagged" with heavy oxygen, Dean Taylor mentioned the fates of water and carbon dioxide taken in by plants. Both compounds contain oxygen, the sum of which is in excess of the plant's needs for its food- and body-building processes. Plants have long been known to give off oxygen: where did it come from? By the use of "tagged" molecules of water and carbon dioxide it has now been demonstrated that the oxygen going in with the carbon dioxide stays in as part of the plant structure, whereas the oxygen that goes in as part of water comes out again as pure oxygen.

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PLANT PHYSIOLOGY

Self-Photo Traces Poison

► RADIOACTIVE TRACER atoms are being used to chart accurately the course of one of the new plant-killing chemicals known as INBA, from the spot where a very small quantity of it is placed on a bean leaf, down the stem and throughout the rest of the plant. The work is being done by Drs. John W. Wood, J. W. Mitchell and George W. Irving, Jr., at the U. S. Department of Agriculture's experiment station at Beltsville, Md.

INBA, which spells out in full as 2-

iodo-3-nitrobenzoic acid, belongs to the same chemical family as the now familiar 2,4-D. It is being used in the present experiments partly because of the readiness with which radioactive iodine can be built into its molecules, making it a tracer compound of high power.

Spread of the poison through the plant can be traced in either of two ways: a Geiger counter can be applied to various parts of the plant body and the "ticks" counted, or the plant can be cut off,



SELF-PHOTO—This picture, taken by the radioactivity of the bean plant itself, shows the traces of the plant-killing chemical.

pressed flat in contact with a photographic film and left for a suitable exposure period, after which the radioactive spots and lines will be found accurately registered on the negative.

The INBA does not spread to any great extent through the leaf to which it has been applied. Instead, it travels with the food formed in that leaf down to the main stem, then up that to its apex, down it into the roots, and up into the other leaves. Both methods of recording its presence show a special tendency for the chemical to concentrate in still-unopened leaf-buds, which accounts for the effectiveness of plant-killers of this type in crippling their victims through prevention of further growth.

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CHEMISTRY

Distilling Esters Off Makes Better Apple Cider

► BETTER FLAVORED cider is promised in the process on which patent 2,419,286 has been issued to W. A. Rooker of Winchester, Va. Before permitting the apple juice to ferment, he distills off the volatile esters and other compounds responsible for apple flavor, which are partly lost in fermentation.

Then, after fermenting the juice to the proper point he puts the flavors back in.

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MEDICINE

Electric Test for Heart Picks Cases Overlooked

► HEART DISEASE undetected by the ordinary methods used by physicians can be spotted now.

One out of four persons ill with heart disease does not show characteristic patterns on the ordinary electrocardiograph.

Dr. Frank N. Wilson and associates of the University of Michigan use exploring electrodes placed successively across the chest, from the right of the breastbone to the left border of the chest.

Records obtained from these chest positions give information about the heart of a more direct nature than do the usual electrocardiograms obtained from electrodes on more distant areas of the wrist and ankle.

Studies by Dr. Maurice Sokolow and associates in the University of California Medical School show the new method is now ready for application to patients.

Electrocordiographs record and measure electric waves transmitted to the areas of wrist and ankle by the contraction of the heart. The waves produce patterns characteristic of the different conditions affecting the heart. Dr. Sokolow said characteristic patterns can be determined in about 75% of patients with heart disease.

Some localized abnormalities of the heart are obscured by the larger mass of more normal heart muscle in the transmission of the impulse from the heart in the conventional placing of the electrodes. In these cases the ordinary electrocardiogram appears normal, although heart defects are present.

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CHEMISTRY

Onion Juice with 2,4-D Is Fatally Unpleasant

► ONION JUICE mixed with 2,4-D boosts the weed-killing capacity of the chemical from ten to twenty fold. This is shown in experiments at Michigan State College, carried out by E. H. Lucas and Dr. C. L. Hamner.

They mashed up onions and mixed the juice with distilled water in varying proportions, then dissolved 2,4-D and sodium carbonate in the mixture. This was used on test plants, alongside of other test plants receiving "straight"

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2,4-D solution. The 2,4-D with onion-juice added proved many times more effective.

Proportions of 2,4-D to onion juice were quite important, the experiments showed. Greatest effect was obtained when one part of onion juice was dissolved in from twenty to thirty parts of water. Both above and below that ratio the killing power diminished.

Curiously enough, no increase in killing power of the 2,4-D took place when garlic juice was substituted for onion juice, although garlic is a close botanical relative of onion. Tomato juice even caused a falling off in killing power.

The two experimenters state that they do not know yet why onion juice should have such an enhancing effect on 2,4-D. They are continuing their experiments. The onion juice won't smell up your yard, by the way.

Science News Letter, May 3, 1947

PHYSICS

V-2 Rocket Tests Diffuser of Ram-Jet

► GERMAN V-2 rockets fired over the desert at White Sands, N. Mex., are helping American scientists plan new high-speed power plants for future flying.

A Nazi missile fired recently carried a section of a ram-jet, or "flying stovepipe." In a successful experiment, the V-2 served as a flying wind tunnel to test the diffuser of a ram-jet. The diffuser slows down incoming air on the flying stovepipe so that the compressed air can be used to speed the ram-jet.

Pressures measured as the diffuser on the head of the rocket soared to an altitude of 88 miles were received by scientists on the ground by means of radio equipment.

Most of the flight was wasted on the ram-jet test as the flying stovepipe requires oxygen, while the V-2, carrying its own supply, reaches altitudes higher than ram-jets will be able to fly.

Army Ordnance experts said that ram-jets are designed for flight at certain altitudes with the highest about 90,000 feet, or a little above 17 miles. Rockets have reached altitudes of more than 100 miles.

Ram-jets for flight at lower altitudes are predicted for the future with speeds twice that of sound, but booster rockets will be needed to achieve speeds great enough for the ram-jet to operate.

Science News Letter, May 3, 1947

IN SCIENCE

GEOLOGY

Wrong Glaciers Used To Interpret History

► THE WRONG kind of glaciers were used as examples in interpreting the recent geologic history of the Midwest, Prof. William H. Hobbs of the University of Michigan pointed out to the American Philosophical Society meeting in Philadelphia. The story of Ice Age deposits has been read in terms of the relatively puny glaciers of the Swiss Alps, which were the best-known glaciers at the time when the idea of Ice Ages was first proposed.

There is one place in the world, now easily accessible, where the same kind of ice sheet still exists that spread over most of eastern North America during Pleistocene time. This is Greenland. It will be necessary to reinterpret North American glacial history in terms of what is going on in Greenland now, Prof. Hobbs declared.

Science News Letter, May 3, 1947

WILDLIFE MANAGEMENT

Dry DDT Best to Keep From Killing Fish Food

► DDT USED for mosquito control on waters in which fish live will do less harm to water insects and other small aquatic life forms on which fish feed if applied as a dry dust than if sprayed as an oil solution or a water emulsion. This conclusion was reached by Clarence M. Tarzwell of the U. S. Public Health Service, as a result of careful experiments on a series of shallow ponds at the Carter Memorial Laboratory near Savannah, Ga.

Emulsions putting DDT on the water at the rate of one-fifth of a pound per acre killed some fish directly, as well as many of their food insects. Dusting treatments at the rate of one-tenth of a pound per acre disturbed the balance of life in the ponds to at least a slight extent; when the rate was reduced to one-quarter of that, the effects were correspondingly diminished.

Details of the research are given in *Public Health Reports* (April 11).

Science News Letter, May 3, 1947

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E FIELDS

EPIDEMIOLOGY

Wild Birds' Mites Carry "Sleeping Sickness" Germ

► MITES on wild birds such as yellow-headed blackbirds and English sparrows carry the dangerous virus that causes encephalitis, commonly called sleeping sickness, five scientists at the University of California have discovered. The scientists are Drs. W. C. Reeves, W. McD. Hammon, D. P. Furman, H. E. McClure and B. Brookman.

The mites are considered another link in the chain connecting wild and domestic fowl with the transmission of horse and human encephalitis and with the survival of the virus germ between epidemics. Chicken mites and some common mosquitoes have previously been found carrying the virus.

Attempts to prove that the wild bird mites transmit the disease have not yet been made. The discovery was made with mites taken from birds' nests in Kern County, Calif. They carried the virus of western horse encephalitis. Guinea pigs, hamsters and mice got the disease when injected with this virus from the mites. Details are reported in *Science* (April 18).

Science News Letter, May 3, 1947

PHYSICS

Compound Is Sensitive To Ten-Millionth of Degree

► AN ELECTRIC temperature-measuring device so sensitive that it responds in a thousandth of a second to a temperature change of as little as one ten-millionth of a degree was described before the meeting of the American Philosophical Society in Philadelphia by Prof. Donald H. Andrews of the Johns Hopkins University.

The instrument, known technically as a bolometer, was developed during the war when it became necessary to measure small pulses of infra-red radiation. The sensitive part of the device was made of an unusual compound of an unfamiliar chemical element; columbium nitride. This passes small electric currents with virtually no resistance when operated at a very low temperature.

Hooked up to a loudspeaker, this superconducting bolometer gave out characteristic sounds when the infra-red pulses struck it. When no current was being passed through, it still gave out sounds, but of a different kind; these were caused by the movements of the electrons within the superconducting strip. One unexpected result was the picking up of local radio broadcasts when the bolometer was at certain temperature levels.

Science News Letter, May 3, 1947

PLANT PHYSIOLOGY

Heated Corn Seedlings Produce Sterile Pollen

► HEAT-TREATED corn seedlings grow up into plants unable to produce fertile pollen, reports Dr. Donald F. Jones, geneticist of the Connecticut Agricultural Experiment Station, in *Science* (April 11). He suggests that this discovery may be of value in hybrid plant breeding, where precautions to prevent fertilization with the plant's own pollen are often elaborate, toilsome and costly.

In his experiments, Dr. Jones sprouted corn grains at 85 degrees Fahrenheit, and when their roots and shoots were between one-quarter and one-half inch long exposed three lots of them for one hour to temperatures of 104, 122 and 140 degrees, respectively. They were then planted in plots and left in the greenhouse until it was certain that they would grow, after which they were set out in the field alongside plants from the same kind of seed that had been planted in the open, in the ordinary way.

The heat-treated seedlings grew up into plants that averaged 90 inches in height, as against 101 inches for the unheated controls. They formed tassels, but produced no viable pollen.

Another observation by Dr. Jones indicates that Iowa is not necessarily where the tall corn grows. He states that corn from the same lot of seed planted in the Northeast and Midwest at the same latitude grows taller in the East. Higher temperatures and brighter sunlight may have something to do with this. Also, corn grown under the partial shade of tobacco cloth grows taller and has thinner leaves than corn immediately outside the shelter, though in this instance the temperatures are the same.

Science News Letter, May 3, 1947

CHEMISTRY

Chemical Coating Lessens Danger from Exhaust Pipe

► DANGER of fire from hot exhaust pipes, on aircraft for instance, is lessened by a new coating, Prof. Dwight G. Bennett of the University of Illinois told the American Ceramics Society in Atlantic City, N. J. It is the result of war time research to kill the visible red and invisible infra-red glow of bomber exhausts that would allow the enemy to detect the plane.

The coating contains uverite, a commercial product compounded from oxides of calcium, titanium, and antimony. A top coat of this over a base ceramic coat provides heat insulation, radiation reflection and radiation suppression. It protects the metal from the hot gases, and allows it to operate at a lower temperature. The coating kills 90% of the visible glow and the infrared radiation.

Science News Letter, May 3, 1947

ELECTRONICS

Microwave Beacon to Guide Ships from Lighthouse

► THE FAMILIAR lighthouses that mark American coasts may soon send out invisible radio signals to guide ships at sea, as well as the present visible flashing light. A new electronic beacon for the purpose has been revealed by General Electric.

Microwave beacons they should be called, because they use this exceedingly short wave which, like radar pulses, travels unhindered through fog, rain, snow and sleet. A unit, built for the U. S. Coast Guard, will be tested early in May at New London, Conn. Its signals will be receivable only on radar-equipped vessels. The signals will appear as a bright ray on the ship's radar indicator, showing the exact direction of the beacon in the same way that the lighthouse is located by its beam of light.

The beacon equipment consists of two main units, the transmitter and antenna. It beams the radar waves in all directions from a vertical dipole antenna that resembles a policeman's nightstick in shape. One lighthouse tube powers the unit. The beams are in the 3,200 megacycle range.

Science News Letter, May 3, 1947

ASTRONOMY

Sun Will Be Blotted Out

Moon will come between the earth and sun on May 20 for fortunate observers in path of totality. Expeditions of astronomers to observe eclipse.

By MARTHA G. MORROW

► THE MOON will come between the earth and the sun late this month, completely blotting out old Sol's bright disk for the fortunate few who are within the path of totality. On Tuesday, May 20, the shadow cast by the moon will sweep down upon the earth.

At least a partial eclipse will be visible generally over all of South America except parts of Ecuador, Colombia and Venezuela. Varying amounts of the sun will be hidden for seafaring observers in the Atlantic Ocean between South America and Africa.

People in all of Africa except the northern tip of Tunisia will see at least some of the sun hidden by the moon. Those nearer the path of totality will see more of the disk blotted out. Partial phases of the total solar eclipse will be visible for observers near the Red Sea in southern and western Arabia, and the western half of Madagascar.

Not Visible Here

But not even a partial phase of the eclipse will be visible in North America, or in Europe, except for extreme southern Spain. So astronomers, anxious to witness the total eclipse in all its glory, have made their way to South America and Africa to observe nature's grandest spectacle.

The path of the total phase of the eclipse, about 84 miles wide at this point, will touch the earth at sunrise off the coast of Chile, and race across the Andes. From there it passes over Mendoza in the western highlands of Argentina and through the Cordoba hills. The sun now has an altitude of 8½ to 13 degrees, and the path has widened slightly. Totality will last between two and one-half minutes, and two minutes 40 seconds, according to calculations made at the Nautical Almanac Office of the U. S. Naval Observatory.

The Brazilian highlands, in the states of Sao Paulo and Minas Geraes, are considered the most favorable location in

South America for the observance of the eclipse. At Sao Salvador, close to the central line, the total eclipse will last four minutes 14 seconds. This is within several seconds of the maximum duration for any place in South America. The sun will be fairly high at mid-totality.

Totality will last the longest, five minutes 14 seconds, at a point on the Atlantic at latitude one degree 22 minutes north, and longitude 19 degrees 15 minutes west. No islands in the South Atlantic Ocean, however, lie within the path.

Duration of Eclipse

Early in the afternoon the dark shadow cast by the moon will touch the coast of Liberia to the south of Monrovia. The duration of the total eclipse here will be about four minutes 54 seconds, in the center of the path, with the sun almost 60 degrees high. From this point the path continues along the south coast of the equatorial bulge of Africa, through Liberia, the Ivory and Gold Coasts.

Sweeping from Nigeria to the Cameroons, the eclipse crosses French Equatorial Africa and the Lake Plateau regions of the Belgian Congo, Uganda and Kenya. The moon's shadow leaves the earth at sunset south of Nairobi. The path gradually narrows from 112 miles on the coast of Liberia to about 80 miles at sunset, and the duration of totality decreases from about four minutes 58 seconds, early in the afternoon for those off the coast of West Central Africa, to about two and a quarter minutes at sunset.

Simultaneous observations of the total eclipse will be made from stations near Montes Claros, Brazil, and on the Gold Coast region of South Africa. Astronomers from Sweden's three most famous observatories, Stockholm, Uppsala and Lund, will make observations expected to add not only to our knowledge of the sun and the moon, but to give us more exact information about the earth itself.

The first appearance of the flash spectrum, caused by light from the sun's outer envelope and visible only at the very beginning and end of a total eclipse, will be accurately clocked at both stations. More exact calculations than previously possible of the longitude of the two observation points will be made from these data.

Expeditions will be sent to the two coasts under the auspices of the Geodetic Survey of Sweden. Preliminary work on the flash spectrum was conducted under the direction of Dr. Bertil Lindblad, director of the Stockholm Observatory, during the last total eclipse, that of July 9, 1945.

Brown University and the Skyscrapers, Rhode Island astronomical organization, are jointly sponsoring an expedition to Brazil. Araxa, about 300 miles northwest of Rio, is the chosen observation site.

The eight experienced eclipse observers, led by Prof. Charles H. Smiley, left Providence a few weeks ago. En route by ship to Rio de Janeiro, Prof. Smiley "shot the sun" to acquire new solar refraction data that promise to save the lives of lost polar explorers of the future.

Measurements made during the past three years of the flattening of the sun near sunrise and sunset have laid the groundwork for tables showing by what amount observations of the sun, moon, planets and stars near the horizon must be corrected because of atmospheric refraction. Observations made during this journey complete sunrise and sunset studies for all latitudes from the tropical to the frigid zone.

Large Expedition

An elaborate expedition is being sponsored by the Army Air Forces and the National Geographic Society. Most of the scientists have already reached the "eclipse town" near Bocayuva, about 400 miles north of Rio de Janeiro. Here the total eclipse will last three minutes 48 seconds, and the chances of clear weather are good.

Additional groups participating in the expedition include scientists from the National Bureau of Standards, Lick Observatory of the University of Cali-

ifornia, Yerkes Observatory of the University of Chicago, Georgetown Observatory, U. S. Naval Research Laboratory, Bartol Research Foundation and the National Broadcasting Company. Including doctors and cooks, the personnel of the party numbers around 75.

Scientists in the expedition hope to complete a number of objectives, and bring home much information for later analysis. The sun's pearly corona, visible at totality, will be photographed in black and white, and also in color. Photographs are to be obtained showing the polarization of corona light. Two specially built spectrographs will be used for studying the flash spectrum and the corona.

Brightness Variation

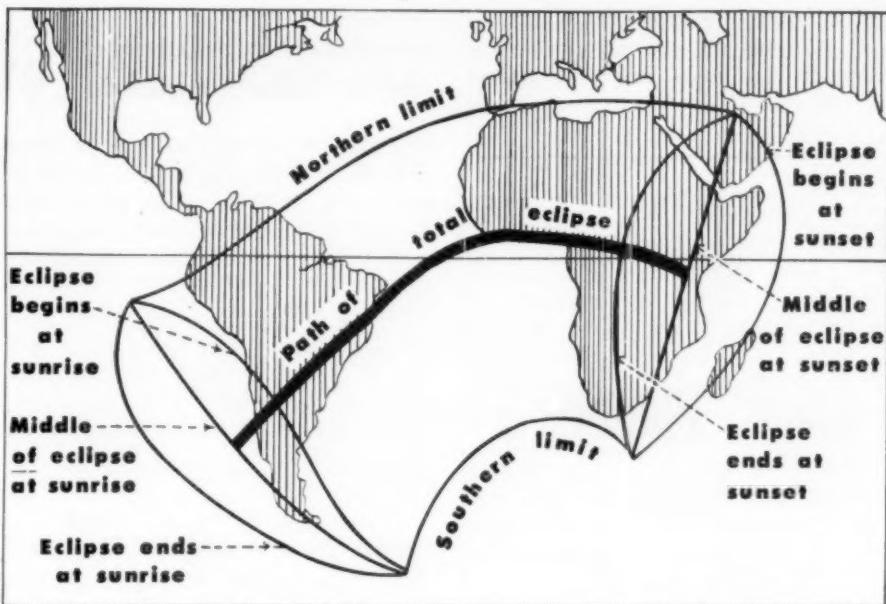
Variation in the brightness of the crescent of the sun as totality is approached will be measured, as will the exact times at which the moon makes the four contacts with the sun's disk. The distribution of daylight intensity at various altitudes during the eclipse will be studied. Radio observations of changes which take place in the ionized layers of the earth's atmosphere will be made.

Geiger counter apparatus, specially built for the expedition, will be used to measure the intensity of the hard component of cosmic rays, known as mesotrons. During the eclipse a "cosmic ray flying laboratory" will fly over the Bocayuva area, obtaining cosmic measurements. Additional tests will be made from the camp-site where recording instruments will be sent to heights of over 12 miles by radiosonde balloons.

Einstein's famous theory of relativity will be given a new and painstaking test to determine whether light rays from certain stars are bent as the rays pass near the sun on their way to the earth. A total eclipse of the sun offers the only opportunity to make this test, as ordinarily the light of stars in the same direction as the sun is drowned out by the sun's glare.

Astronomers at other eclipses during the last three decades have measured the apparent displacement of the stars close to the sun, but their pictures showed that the light rays, from the stars were bent by varying amounts. This time the temperature and pressure at high altitudes will be measured to determine how much of the bending of the light is caused by the earth's atmosphere.

A specially equipped airplane will make a series of photographs of the



ECLIPSE OF SUN—Extent of the eclipse of May 20, with the path of totality, is shown as calculated by the U. S. Naval Observatory.

eclipse from an altitude of 30,000 feet, far above the region where possible clouds might interfere. An attempt will also be made to photograph the moon's shadow as it races across the earth.

Back in the United States, where not even a partial eclipse will be seen, the sun will be watched closely by a few astronomers in Climax, Colo. At the High Altitude Observatory of Harvard University and University of Colorado, man-made eclipses will be created with the coronagraph. The sun's corona and prominences at the time of the eclipse will be photographed for comparison with photographs taken by eclipse expeditions.

Other Expeditions

Other countries throughout the world are also planning expeditions. Dr. F. R. Link of Prague, Czechoslovakia, expects to observe the eclipse from Araxa.

Astronomers in South America are also planning to take advantage of the near-by eclipse. Two parties of Brazilian astronomers will observe the eclipse from points near Araxa and Lassance. Of the three parties planning to observe from Argentina, none will represent foreign groups.

An expedition, under the direction of Dr. Enrique Gaviola, from the Argentine National Observatory at Cordoba, is expected to make its headquarters about 50 miles north of Cordoba. A

group from the La Plata Observatory, probably headed by Dr. C. V. Cesco, will locate near Corrientes, in northern Argentina near the border of Paraguay, or at Tostado, southeast of Corrientes. This party may divide its work between the two sites. A group representing the Asociacion Argentina "Amigos de la Astronomia," under the leadership of Dr. B. H. Dawson, will observe the eclipse at Itati, also in northern Argentina near Paraguay.

Scientists who have spent many weeks preparing for the eclipse and have traveled many weary miles to a favored location are hoping for clear skies. Their friends throughout the world trust that Operation Eclipse, anxiously awaited and lasting only a few minutes at best, will succeed.

Science News Letter, May 3, 1947

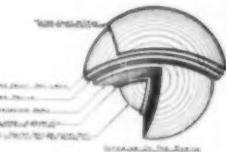
PHYSICS

Doctor's Stethoscope Has Amplifier Built into It

► A LISTENING instrument is covered by patent 2,419,471, taken out by Merle F. Thibos of Niles, Mich., on a physician's stethoscope with a radio-like amplifier built into it. Microphone, tubes, batteries and all other necessary parts are packed into a container about the size of a pocket flashlight, so that the apparatus is readily portable and not cumbersome to use.

Science News Letter, May 3, 1947

Early fruiting of *tomatoes* is discouraged by pinching off the tops of the vines; the first fruits form on the main stem.



Atoms, Planets & Stars

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- 7.—Twenty of the brightest stars and their distances.
- 8.—Our solar system in a nut shell. Shows our relative distance to other stars.
- 9.—Our location in the Milky Way Galaxy, and time to reach nearest star.
- 10.—Curvature of the earth with comparative heights and depths.
- 11.—A drawing showing the way of measuring the distances to near stars.
- 12.—Showing movement of comet tails, and their paths thru outer space.
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(Please Mention SCIENCE NEWS LETTER)

PHOTOGRAPHY

Heavy-Weight Camera Makes Picture in Minute

► A HEAVY-WEIGHT camera, complete with developing and fixing equipment, that made it possible to see pairs of photographs one minute after they were taken, was developed during the war.

Details of the 100-pound camera were released recently in a report made public by the Department of Commerce. The camera was built by the Kannestine Laboratories in Houston, Texas, for the wartime office of Scientific Research and Development.

The wartime camera was designed for reconnaissance work. The shutter and film operated automatically by an electric motor while the observer concentrated on watching the negatives. A stereoscopic device was used to view the pictures after the exposed film was held in the developer tank for about a minute.

The report issued recently suggested several improvements needed to perfect the big camera. Greatest disadvantage is the weight.

Earlier this year, Edwin H. Land of the Polaroid Corporation, Cambridge, Mass., announced the development of a process for producing a finished picture in one minute. This process was claimed to be adaptable to small cameras. (See SNL, March 3).

This report, PB-51003, may be obtained from the Office of Technical Services, Department of Commerce, for \$1.00 on microfilm.

Science News Letter, May 3, 1947

PLANT PHYSIOLOGY

2,4-D Can Blight Plants Before They Are Born

► PLANTS can be blighted by the killer-chemical, 2,4-D, even before they are born. Dr. A. M. S. Pridham, Cornell University horticulturist, sprayed some plants of red kidney bean with 2,4-D while their pods were ripening. Seeds from these pods were planted, and produced a new generation of plants that had all the crippled appearance of plants that had been directly attacked with the chemical. Offspring of unsprayed plants kept as controls remained perfectly normal.

Science News Letter, May 3, 1947

Do You Know?

Egg whites before whipping should be at room temperature; they whip up more quickly and expand to greater volume.

Surfaces should be cleaned before painting; paint and dirt can be mixed but they make an unsightly, streaky mixture.

"Positex", a new British-developed form of rubber latex, is used to treat soft twisted yarn; it gives it the tensile strength of hard twisted yarn.

Man and certain species of ants are the only two members of the animal kingdom that wage war in battle formation; other animals fight duels or sometimes engage in gang fights.

Less than one-third of American farms are now operated by tenants; farm tenancy has decreased 7% since 1940.



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ENGINEERING

Chemical Tests for Rocks

► STRONG ROCKS do not always make good concrete, and weak rocks do not always cause deterioration, the American Society of Civil Engineers in Phoenix, Ariz., was told by R. F. Blanks of the U. S. Bureau of Reclamation. Chemical tests of the rocks, he indicated, are necessary.

He described a research project now nearing completion in the Bureau's laboratories which has evolved a quick chemical procedure which provides a degree of assurance against misbehavior of the rock used in concrete as an aggregate, or filler, when in company with the other ingredients used.

Present standard tests, he said, are designed to determine the quality of aggregate as rock, not as a component of concrete. The difficulty is the concept that strong and durable rock necessarily contributes to strength and durability in concrete, and that weak rocks directly contribute to unsoundness.

Highway Paving

"Tailor-made" highway pavements to meet climatic, traffic and subsoil conditions are necessary, the engineers were told by Donald J. Steele of the U. S. Public Roads Administration.

While reporting some progress in formulating types of pavement surfaces and subsurfaces, he emphasized that the selection of types and thicknesses of both should be governed by the volume and weight of traffic to be carried. Concrete slabs today average about eight inches, but tops only four or five inches

thick, built 25 to 35 years ago, are still in service because of their good foundations.

Thicknesses of surface slabs as high as 10 inches of reinforced concrete have proved deficient when placed on fine-grained soils instead of coarse granular material. The available evidence, he declared, indicates that the greatest single cause of pavement failures in the past has been lack of adequate substructure.

Science News Letter, May 3, 1947

PSYCHOLOGY

Americans Worry Too Much About Mental Diseases

► IF YOU HAVE ever thought: "Am I going crazy?" here is reassurance:

Americans worry too much about mental disease, Dr. C. Charles Burlingame, president of the Institute of Living, formerly known as the Hartford Retreat, warned. And we may be developing a "national schizophrenic personality."

People are bewitched by psychiatric jargon and see mental disease in perfectly normal emotional swings. Unless this dangerous preoccupation is stopped, Dr. Burlingame told the board of directors of Connecticut's oldest mental hospital, thousands of Americans will be looking for help from mental specialists.

The vast majority will never have the opportunity to get within speaking distance of a psychiatrist, even to be reassured that they have no budding serious mental disease. There are only 4,000 psychiatrists to take care of advising all the worried people in the country, and only 2,500 of these are certified by the American Board of Psychiatry and Neurology.

"We have been talking a good deal about taking a leaf from the book of the tuberculosis and cancer movements," said Dr. Burlingame, "preaching that mental illness must be attacked, like tuberculosis and cancer, through a national alertness to early psychiatric disorders."

But the man who thinks he may have signs of tuberculosis or cancer can get a physical checkup promptly. The person who fears he has mental symptoms is not going to be so lucky.

Explaining the developing of a pos-

sible "national schizophrenic personality," Dr. Burlingame observed that "schizophrenic" means "a splitting of the personality," and Americans are split between group generosity and individual selfishness.

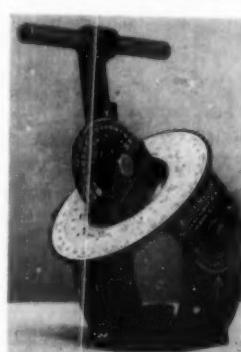
"On one side, we, as a nation, are extolling the need for love and light and philanthropic kindliness around the world, while on the other side we, as individuals, are basing our entire existence on the precept of 'What do I get out of it?'"

He urges a new appreciation of spiritual values and teaching children social responsibility through the establishment of "parentoriums." These would be parent guidance centers, not necessarily related to sickness of any kind.

Science News Letter, May 3, 1947

OBSERVOSCOPE

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BOTANY

NATURE RAMBLINGS

by Frank Thone



Be Careful!

► WILDFLOWER species are a lot like human beings in many respects. Some are adaptable, easy-going, even tough—they can stand almost anything. Others are delicate, sensitive, failing to thrive if their environment is disturbed, even likely to die if they are moved into a strange and unaccustomed place.

Many enthusiastic gardeners perennially get the idea that they would like to have a little corner of their home grounds devoted to a wildflower garden. This is all very well for some species: violets, wild iris, wild lilies, goldenrod, wild asters and a lot of other worthwhile plants will as a rule not resent being kidnaped and set down in a new place. If conditions of soil, moisture and light or shade even approximate those of their old homes they will take hold and thrive very well.

However, there are many other plants to which the average transplanting operation is an almost certain death sentence. Unfortunately, many of these are just the flowers one is most likely to fall in love with and desire to have at home, to see every day—such beau-

tiful things as trillium, lady's slipper, dogtooth violet, twinleaf, fringed gentian and the more delicate kinds of fern. One of the earliest and sweetest-scented of wildflowers, the trailing arbutus, has been completely exterminated over large stretches of its former range by ruthless market-hunters who offered the plants for sale to set out in gardens that could not offer proper living conditions, and where they very soon died.

Only professional botanists, trained horticulturists, or long-experienced gardeners have any natural right to attempt the transplantation of the more sensitive wildflower species. They have learned to judge habitat conditions—

even to measure them with scientific instruments in many instances—before expecting some strange and timid beauty to settle down and live in them.

The home gardener who has "had good luck" with familiar cultivated flowers like nasturtiums, marigolds, zinnias and hollyhocks must always remember that these are the end-products of long generations of selection for toughness and adaptability. Many of them are even able to survive as semi-weeds if left to themselves. Success with them gives no license to attempt the much more exacting task of taming wildflowers.

Science News Letter, May 3, 1947

PSYCHOLOGY

Why Fighter Pilots Crash

► WHEN FIGHTER pilots crash during training due to their own fault, psychologists find the cause may be:

Miscalculation of speed and distance.
Bad planning of the flight.

Not paying attention to the right thing at the right time.

Recklessness.

Not reacting correctly to an emergency.

It was easier than they expected it would be for four Army psychologists to tell what was the pilot trouble in 200 such accidents at Mitchel Field, N. Y., in eight months.

Drs. Richard H. Henneman and Howard J. Hausman of the Strategic Air Command, told the Eastern Psychological Association meeting in Atlantic City, N. J., that such study of accidents will help select better pilots, suggest better methods of training and improve design of equipment.

Mechanical Know-How

► THAT MECHANICAL know-how that the Army found during the war was so important to success as an airplane pilot is really a combination of four independent abilities, Dr. Frederick B. Davis, of the Office of the Air Surgeon, told the meeting.

Pilots have to have an aptitude for mechanical work, be handy with words, be able to use mechanical devices, and know physics. Other factors are also involved, probably eight in all, but these four account for 82% of the difference between individuals in "mechan-

ical comprehension," as this know-how is called.

Mechanical aptitude, one of the factors, is probably also made up of more than one ability. Studies are now being conducted to find out just what it is.

Science News Letter, May 3, 1947

GENERAL SCIENCE

Nations Agree in Science If Not Always in Politics

► SCIENTIFIC cooperation is possible between nations that cannot get along together in other fields, Dr. Arthur H. Compton, chancellor of Washington University, declared before the meeting of the American Philosophical Society in Philadelphia. The proper medium for such cooperation is UNESCO, the educational, scientific and cultural arm of the United Nations.

"Where two nations have ideologically differences that bring danger of wars, many types of interchange of ideas are unwelcome or subject to suspicion," Dr. Compton pointed out. "This applies in particular to the use of radio and the press, to the control of basic education and to religious and philosophical thought. No such difficulty exists in the field of science. Since for securing the peace of the world it is precisely between nations with such differences that it becomes most important to obtain understanding and cooperation, scientific education and research become leading aspects of UNESCO's task."

Science News Letter, May 3, 1947



WYOMING

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Books of the Week

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AND THE MOUNTAINS WILL MOVE—Capt. Miles P. DuVal, Jr.—*Stanford Univ. Press*, 374 p., illus., \$5. This story of the epic struggle to build the Panama Canal concerns itself with three phases: the building of the Panama Railroad; the French effort; completion of the Canal by the United States.

CLINICAL ALLERGY—Alexander Sterling—*Int. Univ. Press*, 198 p., illus., \$5. For general practitioner and student, this monograph is on the management and treatment of allergic diseases.

CUMULATIVE CATALOG OF LIBRARY OF CONGRESS PRINTED CARDS—*Library of Congress*, \$100 a year. To be printed in 9 monthly issues, three quarterly cumulations and an annual cumulation, this catalog is within the financial reach of many libraries unable to support card depository sets. It is an author catalog.

DISCOVERING OUR WORLD, Books One and Two—Wilbur L. Beauchamp, Mary M. Williams, Glenn O. Blough—*Scott*, Book One, 224 p., illus., \$1.48; Book Two, 256 p., illus., \$1.52. For the middle grades, these excellent texts introduce the child to the world of science in which he lives.

THE ETHNOGEOGRAPHIC BOARD—Wendell Clark Bennett—*Smithsonian Inst.*, Misc. Col. Vol. 107, No. 1. Pub. No. 3889, 134 p., paper, 65 cents. An historical survey of the work of this wartime organization whose purpose was to make available to military and war agencies specific regional information and evaluated personnel data available to the sponsoring institutions.

ESSAYS IN SCIENCE AND PHILOSOPHY—Alfred North Whitehead—*Philosophical Lib.*, 348 p., \$4.75. Biographical sketches, thoughts on learning, and some basic theories in mathematics.

THE FLYING NORTH—Jean Potter—*Macmillan*, 260 p., illus., \$3.75. This is the story of the conquest of the north by airplane and of the men who did it.

FRANCIS DRAKE AND THE CALIFORNIA INDIANS, 1579—Robert F. Heizer—*Univ. of Calif.*, Publ. in Am. Archaeology and Ethnology, Vol. 42, No. 3, 50 p., illus., paper, \$1.25, cloth, \$2. Attempts to solve the puzzle of the exact location visited by Drake by identifying the particular Indian tribes he describes in his account.

GUIDE TO INFORMATION ABOUT SWEDEN—Naboth Hedin—*Am. Swedish News Exchange*, 61 p., paper, 25 cents. A bibliography designed to make it as easy as possible to find information in English about modern Sweden.

THE HIVE AND THE HONEYBEE—Roy A. Grout, ed.—*Dadant*, 633 p., illus., \$4. With chapters written by specialists, this manual of bee-keeping considers every aspect of the problems of caring for a honeybee colony, preparing the honey and beeswax, and also history, anatomy and genetics of the bee.

HOW TO TUNE UP YOUR AUTOMOBILE—Jack Steele—*Henley*, 239 p., illus., \$2.50. A practical, everyday guide to help both

mechanics and owners care for cars.

IF YOU NEED AN OPERATION—Richard A. Leonardo—*Froben*, 198 p., \$3. By describing several common uncomplicated operations, this book attempts to relieve the general public's fear of operations and help people to prepare themselves intelligently for the elective ones.

LABOR FORCE DEFINITION AND MEASUREMENT: Recent Experience in the United States, *Social Science Res. Council*, 134 p., paper, \$1. Prepared for the Subcommittee on Labor Force Statistics of the Committee on Labor Market Research.

LEONARDO DA VINCI: A STUDY IN PSYCHOSEXUALITY—Sigmund Freud; trans. by A. A. Brill—*Random House*, 121 p., \$2.50. Written 40 years ago to defend psychoanalysis, this text, with Brill's introduction, points up the long road traveled in understanding.

MULTIPLE FACTOR ANALYSIS—L. L. Thurstone—*Univ. of Chicago Press*, 535 p., \$7.50. A technical work on mathematical psychology, developing and expanding the author's well known *Vectors of Mind* and presenting his method for appraising the abilities of the individual.

NORTHERN FISHES: With Special Reference to the Upper Mississippi Valley—Samuel Eddy and Thaddeus Surber—*Univ. of Minn.*, 2nd. ed. rev., 276 p., illus., \$4. For sportsman, ichthyologist and conservationist this study describes over 150 fresh-water fishes.

PHYSICS EXPERIMENTS AND PROBLEMS—A. J. Burdick and J. J. Dudley—*Singer*, 183 p., illus., paper, \$1. Intended for eleventh and twelfth year high school students, this book of experiments is adapted for use with any textbook.

SALAMANDERS, TOADS, AND FROGS, N. Y. State College of Agric., Cornell Rural School Leaflet Vol. 40, No. 4, 31 p., paper, 10 cents. A helpful guide to the recognition of these little creatures that live near springs.

SUGARS AND SUGAR DERIVATIVES IN PHARMACY—Paul S. Pittenger—*Sugar Res. Found.*, 54 p., illus., paper, free. Valued for a variety of properties and functions, sugar is consumed in the pharmaceutical industry at the rate of over 60,000,000 pounds a year.

TUNGSTEN: Its History, Geology, Ore-Dressing, Metallurgy, Chemistry, Analysis, Applications, and Economics—K. C. Li and Chung Yu Wang—*Reinhold*, 2nd ed. rev., 430 p., illus., \$8.50. This American Chemical Society Monograph is a timely and comprehensive discussion of this useful and strategic metal.

A YANQUI IN PATAGONIA—Bailey Willis—*Stanford Univ. Press*, 152 p., illus., \$3. Planning a city to order in a remote lake and mountain region became the task of the author, who had gone to Argentina in search of prehistoric man.

Science News Letter, May 3, 1947

PHYSICS

Burning Building to Give Fireproofing Information

► THERE'S GOING to be a fire at the National Bureau of Standards in Washington. It won't be a four-alarm affair as it would be if scientists weren't setting it purposely. (Any fire alarm from the government's great research laboratories calls out apparatus equivalent to four alarms).

Furniture and typical office equipment will be placed in a special concrete and cinder block building, now under construction. When the arsonist-engineers apply the scientific torch in about two weeks, temperature measuring devices buried in the office will tell just how hot it gets.

The idea is to find out how high a temperature must be resisted in order to keep fire from spreading. The information will be used in designing more fireproof walls and equipment.

Science News Letter, May 3, 1947

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ADJUSTABLE weight devices, for use on golf clubs with aluminum heads, are aluminum plugs that screw into the under face of the club and enable a player to get just the balance desired. The plugs can be unscrewed with a coin, and additional weights added if wanted.

Science News Letter, May 3, 1947

METER, to locate faulty bonding in plywoods, veneers and other laminated construction, is a cylindrical can with a window on the top and a gage within. In use, it is pressed against the material, and the air within removed. A fault in the bonding contains air, which will cause a bulging under the can sufficient to register.

Science News Letter, May 3, 1947

ELECTRIC LAMP of the incandescent type, recently patented, has a bulb made by joining together two or more sections of different colors to give various color combinations. When lighted in a vertical position, for example, a red light shines on one side, a green light on the other.

Science News Letter, May 3, 1947

KETCHUP dispenser, for table use, applies the tomato sauce in the quantities desired by use of a plastic pump that fits on any popular brand ketchup bottle. Thumb pressure on the head of the dispenser operates a piston that forces the ketchup up a central tube and out a nozzle on the side.

Science News Letter, May 3, 1947



INTEROFFICE conversation equipment, with a single amplifier installed in any out-of-the-way place, uses only a small speaker unit, shown in the picture, on each office desk. The equipment, with 100 feet of connecting wire, is designed for two-station use, but as many as five stations can be used with the amplifier.

Science News Letter, May 3, 1947

HEXAGONAL steel fixtures, designed to clamp on carpenters' steel squares, assist mechanics in laying out many types of angles. The slotted fixture is held in place on the straight-edge of the arm of the square with a thumb

screw, its projecting side giving the angle desired.

Science News Letter, May 3, 1947

SHINGLE gages that fit on a shingler's hatchet, enable carpenters to lay shingle courses accurately and rapidly. They are slotted pieces of round metal that can be fastened firmly to the hatchet blade with a set screw.

Science News Letter, May 3, 1947

COFFEE vending machine, operated by a nickel-in-the-slot device, can produce a fresh cup of highest quality blended coffee, steaming hot, every five seconds. The coffee is delivered in a sanitary paper cup. Sugar, cream and spoon are added, if desired, by pushing special buttons.

Science News Letter, May 3, 1947

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AERONAUTICS

What is unusual about the wings of the plane on the cover? p. 276.

ASTRONOMY

Where will observers be able to see the eclipse? p. 282.

BIOPHYSICS

How much energy do you burn sitting still? p. 279.

BOTANY

What wildflowers can be transplanted? p. 286.

CHEMISTRY

How does onion juice mixed with 2,4-D affect plants? p. 280.

What has made heavy oxygen available? p. 279.

Pictures: Army Air Forces, cover, p. 275; Brookhaven National Laboratory, p. 277; John W. Mitchell, p. 279.

Where published sources are used they are cited.